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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	36

Application Number	09/854,119
Filing Date	05/11/2001
First Named Inventor	Miroslav Trajkovic
Art Unit	2672
Examiner Name	Javid A. Amini
Attorney Docket Number	US010240

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
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- [ ] CD, Number of CD(s) _____
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- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [ ] Other Enclosure(s) (please Identify below):

Remarks

Enclosed is an Appeal Brief and the required fee that are being filed in support of the Notice of Appeal mailed on August 28, 2004.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	LEIMBACH ASSOCIATES		
Signature	James D. Leimbach		
Printed name	James D. Leimbach		
Date	October 25, 2004	Reg. No.	34,374

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	James D. Leimbach		
Typed or printed name	James D. Leimbach	Date	October 25, 2004

PTO/SB/17 (10-04v2)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 340.00

Complete if Known	
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First Named Inventor	Miroslav Trajkovic
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METHOD OF PAYMENT *(check all that apply)*

☐ Check ☑ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number

Deposit Account Name

The Director is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☐ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims		-20** =		X =
Independent Claims		- 3** =		X =
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	44	Independent claims in excess of 3
1203	300	2203	150	Multiple dependent claim, if not paid
1204	88	2204	44	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	340.00
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,370	2453	685	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 340.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	James D. Leimbach	*Registration No. (Attorney/Agent)*	34,374	*Telephone*	585 381-9983
Signature				*Date*	October 25, 2004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of MIROSLAV TRAJKOVIC. MOTION-BASED TRACKING WITH PAN-TILT-ZOOM CAMERA Serial No. 09/854,119 Filed: May 11, 2001	Group Art Unit: 2672 Examiner JAVID A. AMINI I hereby certify that this correspondence is being deposited today with the United States Postal Services as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patent Commissioner for Patents P.O. Box 1450 Alexandria VA. 22313-1450 Name: James D. Leimbach Registration No. 34,374 Date: October 25, 2004

Mail Stop Appeal Brief-Patent
Honorable Commissioner of Patents and Trademarks
Alexandria VA. 22313-1450

Sir:

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Real party in interest

The real party of interest is the Assignee who is U. S. Philips Corporation, a corporation existing under the laws of the State of Delaware (hereinafter Appellant).

Related appeals and interferences

There are no related appeals or interferences to the present application that are known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of the Claims

Claims 1-20 as originally filed are drawn to a method and system for tracking motion within images and aligning images. Claims 1-20 stand rejected and are the claims that are currently being appealed. A copy of appealed claims 1-20 is contained in Appendix I following this brief.

Status of the Amendments After Final

A response was filed subsequent to the final rejection to overcome the Examiner's rejection of claims 1-20 under 35 U.S.C. §103(a). The Examiner in an Advisory Action dated August 16, 2004 indicated that the rejection of claims 1-20 under 35 U.S.C. §103(a) stands. It should be noted that the Advisory Action dated August 16, 2004 indicates that the proposed amendment will not be entered, however, the appellant respectfully points out that the response filed subsequent to the final rejection did not attempt to amend any of the claims.

Summary of the Claimed Subject Matter

The appealed claims define subject matter for first and second images that are initially aligned at the first resolution. Based on the initial alignment, a second alignment approximation

is derived based on the first image and the initially aligned second image with both the first and second images at a second resolution, different from the first resolution. The first and second images at the second resolution are aligned based on a combination of the first and second alignment approximations.

Appealed claim 1 defines subject matter for a method of aligning a first image to a second image as illustrated in Fig. 3 and the description related thereto within the specification to the present invention on page 7, line 5 through page 9, line 19. The determining of a first alignment approximation is based on distances between one or more points in the first image and the second image with the first and second images at a first resolution as indicated by reference numeral 330 in Fig. 3 and described in the specification on page 7, line 10 through page 8, line 2. The alignment of the second image to the first image is based on the first alignment approximation to form an initially aligned second image as indicated by reference numeral 340 in Fig. 3 and described in the specification on page 8, lines 3-10. The determination of the second alignment approximation is based on the distances between one or more points in the first image and the initially aligned second image, with the first and second images at a second resolution different from the first resolution as indicated by reference numerals 350, 360 in Fig. 3 and described in the specification on page 8, line 11-30. The alignment of the second image to the first image is based on the combination of the first and second alignment approximations as indicated by reference numeral 370 in Fig. 3 and described in the specification on page 8, lines 30-31.

Appealed claim 9 defines subject matter for a method of tracking an object based on a first image and a second image as described within the specification to the present invention beginning on page 4, line 2, and illustrated in Fig. 1 and the description related thereto. The aligning of the first and second images to form a set of aligned images is represented by reference numeral 140 and described in the specification to the present invention on page 4, lines 6-8. The detection of motion by comparing the set of aligned images is represented by reference numeral 150 in Fig. 1 and described in the specification to the present invention on page 4, lines 8-11. Appealed claim 9 further defines subject matter wherein: the aligning of the first and second images includes determining a first alignment approximation, based on distances between one or more points in the first image and the second image, with the first and second images at a first resolution, is indicated by reference numeral 330 in Fig. 3 and described in the specification

on page 7, line 10 through page 8, line 2; and aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image, as indicated by reference numeral 340 in Fig. 3 and described in the specification on page 8, lines 3-10. Appealed claim 9 further defines subject matter for determining of a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image, with the first and second images at a second resolution different from the first resolution, is indicated by reference numerals 350, 360 in Fig. 3 and described in the specification on page 8, line 11-30. The aligning of the second image to the first image, based on the combination of the first and second alignment approximations is indicated by reference numeral 370 in Fig. 3 and described in the specification on page 8, lines 30-31.

Appealed claim 13 defines subject matter for a motion detecting system as detailed in the related to Figures 1 and 2 in the specification to the present invention on page 4, line 2 through page 7, line 3, and the description related to Fig. 3 beginning on page 7, line 5. A processor, as represented by reference numeral 222 in Fig. 2, is configured to align a first image and a second image to form a set of aligned images as shown by reference numeral 140 in Fig. 1 by: determining a first alignment approximation based on distances between one or more points in the first image and the second image as indicated by reference numeral 330 in Fig. 3 and described in the specification on page 7, line 10 through page 8, line 2; aligning the second image to the first image based on the first alignment approximation to form an initially aligned second image as indicated by reference numeral 340 in Fig. 3 and described in the specification on page 8, lines 3-10; determining the second alignment approximation, based on distances between one or more points in the first image and the initially aligned its second image, as indicated by reference numerals 350, 360 in Fig. 3 and described in the specification on page 8, line 11-30; aligning the second image to the first image based on a combination of the first and second alignment approximations as indicated by reference numeral 370 in Fig. 3 and described in the specification on page 8, lines 30-31; and a comparison of the set of aligned in the images to identify motion of objects within the first and second images illustrated in Fig. 1 reference numerals 140, 150 as discussed within the specification to the present invention on page 3, lines 15, and page 6, line 12 through page 7 line 3.

Grounds of Rejection to be Reviewed on Appeal

Appealed claims 1 through 20 stand rejected under the provisions of 35 U.S.C. §103 (a) as being obvious over U.S. Patent No. 5,848,121 issued in the name of Gupta et al. (hereinafter referred to as *Gupta et al.*) in view of U.S. Patent No. 5,651,075 issued in the name of Frazier et al. (hereinafter referred to as *Frazier et al.*).

Argument

The rejection of appealed claims 1-20 under the provisions of 35 U.S.C. §103(a) as being obvious over *Gupta et al.* in view of *Frazier et al.*

A. The rejection under 35 U.S.C. S 103(a)

Appealed claims 1 through 20 stand rejected under the provisions of 35 U.S.C. §103 (a) as being obvious over *Gupta et al.* (U.S. Patent No. 5,848,121) in view of *Frazier et al.* (U.S. Patent No. 5,651,075). The examiner's position is that it would have been obvious to one of ordinary skill within the art to apply the teaching of *Frazier et al.* for edge enhancement and shadow reduction to align the images for digital subtraction angiography taught by *Gupta et al.*

B. The references

Gupta et al. (U.S. Patent No. 5,848,121) teach a method and apparatus for digital subtraction angiography which is an X-ray procedure wherein a mask image is taken before the injection of a contrast agent. After injection of the contrast agent, another image is taken that is referred to as the opacified image. Subtraction of the mask image from the opacified image removes all data except for the data that is associated with the opacified blood vessels (see col. 1, lines 11-21). *Gupta et al.* employ match point generation between corresponding sets of point within the mask image and the opacified image. A transformation function maps match points within the mask image to the corresponding match points in the opacified image. The mask image is then subtracted from the opacified image (see col. 2, lines 31-46). *Gupta et al.* teach the matching of corresponding sets of point between a mask image and an opacified image.

Gupta et al. teach identifying match points within a first mask image and an opacified image. In order to identify match points in the mask image with corresponding match points in the opacified image, a tile is formed around match point in the mask image and compared with all tiles in the opacified image. This process is repeated from lowest to highest resolution (see column 3, lines 53-62). Once a set of match points has been established, an image to image transform function is generated for registering image tiles. The image to image transform is used to match points in the subsequent mask images to those previously established in the opacified image (see column 4, lines 7-12).

Note that *Gupta et al.* do not teach or otherwise suggest the determining a first alignment approximation, based on distances between one or more points in the first image and the second image. Instead, *Gupta et al.*, as previously discussed, establish match points, form image tiles around the match points and then the image tiles for the match points within the mask image are compared to each of the image tiles within the opacified image. Furthermore, *Gupta et al.* do not teach or suggest determining a second alignment approximation that is based on the distances between one or more points in the first image and the initially aligned second image. As previously discussed, *Gupta et al.* teach generating an image to image transform that is repeatedly used instead of match points. Moreover, *Gupta et al.* do not teach or suggest aligning images based on the combination of a first alignment approximation with a second alignment approximation. *Gupta et al.* initially generate an image to image transform and the transform is repeatedly used.

Frazier et al. (U.S. Patent No. 5,651,075) teach a license plate reader and image enhancer that is used for removing distortion in an image of a license plate using edge enhancement and shadow reduction (see Abstract). *Frazier et al.* perform edge enhancement and shadow reduction upon a single image using a Laplacian operation (column 5, lines 1-13). Note that *Frazier et al.* teach processing that is performed to enhance a single image and does not discuss or otherwise suggest manipulating or enhancing multiple images.

Frazier et al. locate the edge enhanced, shadow reduced image within an idealized license plate by a correlation system (column 5, lines 14-22). *Frazier et al.* teach that the idealized license plate can be formed by aligning and averaging several images of a license plate (column 5, lines 22-25). Otherwise there is no aligning taught or suggested by *Frazier et al.*

It should be noted that *Frazier et al.* do not disclose, or suggest alignments based on previous alignments or using different resolutions. The appellant respectfully points out that *Frazier et al.* do not provide any teaching for processing, manipulating or aligning two different images based on alignment approximations. *Frazier et al.* teach placement of the license plate image within a template image that is stored in memory as a location process for the image of the license plate. The location process corresponds to the placement of a window allowing the pixel data within license plate image to be identified (column 6, lines 36-43). *Frazier et al.* teach the placement of an edge enhanced, shadow reduced image of a license plate within a template image. There is no alignment of different images based on distances of points or alignment approximations taught or suggested by *Frazier et al.*

C. The differences between the invention and the references

Appealed claim 1

The rejection to appealed claim 1 asserts that the elements of appealed claim 1 are disclosed and suggested within the cited references *Gupta et al.* and *Frazier et al.* The appellant respectfully asserts that the cited references *Gupta et al.* and *Frazier et al.* do **not** separately or in combination disclose, or suggest, the subject matter defined by appealed claim 1. Three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As previously discussed, *Gupta et al.* employ match point generation between corresponding sets of points within the mask image and the opacified image. A transformation function is used by *Gupta et al.* that maps match points in the mask image to corresponding match points in the opacified image. The mask image is then subtracted from the opacified image (see column 2, lines 31-46). *Gupta et al.* teach the matching of corresponding sets of

points between a mask image and an opacified image. There is no teaching or suggestion within *Gupta et al.* for determining a first alignment approximation based on distances between one or more points in the first image and the second image.

Gupta et al. teach matching corresponding points in the mask image and the opacified image (see column 3, lines 53-62). *Gupta et al.* teach that a transform function is established from the initial matching of corresponding points in the mask image and the opacified image. The transform function of *Gupta et al.* is used to match subsequent images with the match points within the opacified image (see column 4, lines 7-12). *Gupta et al.* do not teach or otherwise suggest the determining of a second alignment approximation based on the distances between one or more points in the first image and the initially aligned second image.

As pointed out by the examiner, *Gupta et al.* do not teach or suggest aligning the images based on the combination of a first alignment approximation with a second alignment approximation. The examiner's position is that the Laplacian operation taught by *Frazier et al.* is equivalent to the subject matter defined by appealed claim 1 for aligning the images based on a combination of a first alignment approximation and a second alignment approximation. *Frazier et al.* teach that a Laplacian operation can be performed on a single image to enhance edges and reduce shadows. *Frazier et al.* explicitly teach that the Laplacian operation taught therein is used for edge enhancement to reduce shadows and uneven illumination (column 3, lines 54-56; column 5, line 1-3). The appellant, respectfully, asserts that no reasonable reading of edge enhancement and shadow reduction can be considered as being equivalent to aligning separate images. The position taken by the Final Office Action that edge enhancement and shadow reduction are equivalent to aligning is unsubstantiated. The examiner does not provide any evidence that the substitution of the Laplacian operation for the purpose of aligning could even function or become operative for the stated purpose. A person of ordinary skill within the art would not be motivated to attempt to employ the Laplacian operation taught by *Frazier et al.* for aligning separate images.

The appellant additionally points out that *Frazier et al.* do not perform any processing on two different images. The disclosure of *Frazier et al.* pertains to a single image that is enhanced. A person skilled in the art would not be motivated to use the Laplacian operation taught by *Frazier et al.* for the purpose of aligning the separate images taught by *Gupta et al.*

The cited references, *Gupta et al.* and *Frazier et al.*, do not provide any a reasonable expectation of success for the substitution suggested by the examiner in the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The assertions within the Final Office Action that the Laplacian operation taught by *Frazier et al.* can be employed for the purpose of aligning the separate images taught by *Gupta et al.* are hindsight recreations that find no support within the cited references themselves.

Appealed claim 1 defines subject matter for "aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image" and "aligning the second image to the first image, based on the combination of the first and second alignment approximations." Neither *Gupta et al.* nor *Frazier et al.*, either alone or in combination, disclose or suggest the subject matter of "aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image" or "aligning the second image to the first image, based on the combination of the first and second alignment approximations." In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Appealed claim 1 recites subject matter for aligning two images. During examination the claims are interpreted as broadly as their terms reasonably allow and the words of the claim must be given their plain meaning unless the applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir.1989). The plain meaning of aligning is not equivalent to edge enhancement, or shadow reduction, or any combination thereof. The specification to the present invention provides clear definitions to the terms aligned, aligning and alignment of two images, as discussed in the Summary of the Claimed Subject Matter, *infra*. The description within the specification to the present invention provides no basis for interpreting aligning as edge enhancement or shadow reduction. Accordingly, while words within a claim must be given their broadest **reasonable** interpretation, the appellant asserts that the examiner's interpretation and treatment of the terms edge

enhancement or shadow reduction as being equivalent to the term aligning is **not a reasonable** interpretation. *Frazier et al.* provide no basis for interpreting edge enhancement and shadow reduction as being equivalent to "alignment", "aligned", or "aligning" as defined by the specification to present invention. The terms "alignment", "aligned", or "aligning" are used extensively throughout the entire specification to the present invention, as discussed in the Summary of the Claimed Subject Matter, *infra*, in a manner that is wholly inconsistent with the terms edge enhancement or shadow as commonly used within the relevant arts. The rejection to appealed claim 1 applies a definition to the terms "alignment", "aligned", or "aligning" that is wholly inconsistent with the definition commonly applied to these terms and completely contrary to the definition that is supplied for these terms throughout the specification to the present invention, as discussed in the Summary of the Claimed Subject Matter, *infra*.

The appellant has the right to be his own lexicographer. The courts have held that where an explicit definition is provided by the applicant for a term, that definition will control the interpretation of the term as it is used in the claim, and that the meaning of words used in a claim is not construed in a lexicographic vacuum, but in the context of the specification and drawings. *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999). The appellant would like to respectfully point out that the lexicographic determination of claim terms can be a difficult task, but this is not one of those instances where the task is difficult. Simply put, even using the broadest reasonable interpretation of the terms "alignment", "aligned" and "aligning", there is no reasonable interpretation that would construe these terms is being equivalent to either edge enhancement or shadow reduction. Edge enhancement and shadow reduction are processes that are performed upon singular images not between multiple images. Moreover, the specification to the present invention has supplied extensive definition to the terms "alignment", "aligned" and "aligning", and the Examiner may not construe these terms in a manner that is wholly inconsistent with that definition supplied by the specification to the present invention, as discussed in the Summary of the Claimed Subject Matter, *infra*.

Appealed claim 2

The rejection to appealed claim 2 asserts that it would be obvious for a person of ordinary skill within the art to apply the Laplacian operator taught by *Frazier et al.* to the images disclosed by *Gupta et al.* for "aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation".

Neither *Gupta et al.* nor *Frazier et al.* disclose or suggest any second alignment approximation. As previously discussed under appealed claim 1, *Gupta et al.* teach that once match points are established between the original mask image and the opacified image, a transfer function is used to correlate the different mask images to the opacified image. There is no second alignment approximation taught or suggested by *Gupta et al.* As point out by the examiner in the Final Office Action, *Gupta et al.* do not teach "aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation".

The examiner's position is that Figures 4b and 4c of *Frazier et al.* teach first and second alignments. *Frazier et al.*, in Figures 2, 4a, 4b and 4c, teach that a first Laplacian operation can be applied to an area containing a license plate as shown in Figure 2 to create the image shown in Fig. 4a, an enlarged version of which is shown in Figure 4a. *Frazier et al.* teach that a second Laplacian operation can be performed to the image shown in Figure 4b to create the image illustrated in Figure 4c (see column 5, lines 1-14). Note that there is no discussion within *Frazier et al.* for aligning two different images. It should be pointed out that the examiner's position regarding Laplacian operations for edge enhancement and shadow reduction as taught *Frazier et al.* being equivalent to aligning multiple images is not disclosed or suggested by the teachings of *Frazier et al.* As previously discussed under Appealed claim 1, *Frazier et al.* do not teach aligning different images. *Frazier et al.* teach edge enhancement and shadow reduction of a single image, as previously discussed under Appealed claim 1. The enhancing of edges and the reduction of shadows in a single image are not equivalent to aligning separate images. Moreover, the multiple Laplacian operations of *Frazier et al.* do not disclose or suggest "aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation". *Frazier et al.* teach edge

enhancement, shadow reduction and illumination control. Simply put, *Frazier et al.* do not disclose or suggest aligning multiple images.

Appealed claim 3

The rejection to a claim 3 asserts that the subject matter for determining the first alignment approximation based on the first resolution being a low-resolution representation of the first and second images, and determining the second alignment approximation is based on the second resolution being a higher-resolution representation of the first and second images is taught by *Gupta et al.*

Appealed claim 3 defines subject matter that more clearly defines the subject matter defined by appealed claim 1. As previously discussed, *Gupta et al.* do not teach or suggest determining a first alignment approximation, based on distances between one or more points in the first image and the second image. Additionally, *Gupta et al.* do not disclose or otherwise suggest determining a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image. The appellant respectfully points out *Gupta et al.* teach establishing match points in the mask image and the opacified image. A transformation maps the match points in the mask image to the corresponding match points in the opacified image (see column 3, lines 1-19 and column 5, lines 7-12). The matching process as taught by *Gupta et al.* uses a transform function for subsequent images (see column 5, lines 7-12). *Gupta et al.* specifically teach that the transform is used instead of match points for the subsequent registration of images.

Gupta et al., teach implementing several mask images of varying resolutions, however, only a single opacified image is taught by *Gupta et al.* Therefore, because the opacified image of *Gupta et al.* only has a single resolution, *Gupta et al.* do not teach or suggest to a person skilled in the art a first alignment approximation based on a first resolution being a low-resolution representation of the first and second images and a second alignment approximation based on a second resolution being a higher-resolution representation of the first and second images.

Moreover, neither *Gupta et al.* nor *Frazier et al.* teach or suggest aligning the images based on the combination of a first alignment approximation with a second alignment

approximation. There is no alignment approximation taught or suggested by either *Gupta et al.* or *Frazier et al.*, much less any teaching or suggestion for aligning images based on a combination of a first alignment approximation and a second alignment approximation.

Appealed claim 4

Appealed claim 4 defines the subject matter of appealed claim 1, wherein determining at least one of the first alignment and second alignment approximations includes applying the RANSAC algorithm. The Examiner's position is that *Gupta et al.* at column 2, lines 31-46 teach applying the RANSAC algorithm to determine at least one of the first alignment and second alignment approximations. The appellant, respectfully, points out that *Gupta et al.* at column 2, lines 31-46 disclose match point generation of two-dimensional points in the mask image and corresponding points in the opacified image. *Gupta et al.* at column 2, lines 31-46 teach the generation of transformation function and a subtraction algorithm that used in the digital subtraction angiography taught therein. There is no disclosure, or suggestion, within *Gupta et al.* for implementing RANSAC algorithm to determine at least one of the first alignment and second alignment approximations. Note that no reasonable expectation of success exists within *Gupta et al.* for implementing RANSAC algorithm to determine at least one of the first alignment and second alignment approximations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As previously discussed, *Frazier et al.* do not align different images as asserted by the Final Office Action. The rejection within the Final Office Action asserts that the RANSAC algorithm is well known within the art therefore replacing the Laplacian operation of *Frazier et al.* within the RANSAC algorithm defined by appealed claims 4 would be obvious to a person of ordinary skilled in the art. *Frazier et al.* teach use of the Laplacian operation for edge enhancement and shadow reduction. A person of ordinary skill within the art would not be motivated to use Laplacian operation taught by *Frazier et al.* to align multiple images and, clearly, would not envision using a RANSAC algorithm to align multiple images because, simply put, this is not taught or suggested by the disclosure of *Frazier et al.*

The elements of appealed claim 4 are not found alone or in the combination made by the rejection contained within the Final Office Action. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution suggested by the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Appealed claim 5

Appealed claimed 5 defines subject matter wherein the determining of the first alignment approximation includes an approximation of at least one of a rotation component and a translation component in an image space of the first and second images. The examiner's position is that *Gupta et al.* teach at column 3, lines 63-67 "determining the first alignment approximation includes an approximation of the least one of a rotation component and a translation component in image space of the first and second images." The appellant, respectfully, points out that *Gupta et al.* at column 3, lines 63-67 teach that image tiles within two images can be rotated with respect to each other and that the mismatch arising because of such rotation can be corrected by the two-dimensional perspective transformation on user provided points. There is no disclosure, or suggestion, within *Gupta et al.* for determining the first alignment approximation using an approximation of at least one of a rotation component and a translation component in image space of the first and second images as recited by appealed claim 5. Moreover, as previously

discussed, *Frazier et al.* do not teach or suggest aligning different images as asserted by the examiner in the Final Office Action.

Appealed claim 6

Appealed claim 6 defines subject matter wherein determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix. The examiner's position is that implementing a 3x 3 homographic matrix to determine the second alignment approximation would have been obvious to a person of ordinary skill within the art. The appellant, respectfully, points out that the Final Office Action does not provide any disclosure or suggestion within the cited references for use of a 3 x 3 homographic matrix. Moreover, the Final Office Action has not indicated how a 3x3 homographic matrix would be used within either of the cited references to determine alignment approximations. Note that there is no 3x 3 homographic matrix discussed within the cited references. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution suggested in Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Appealed claim 7

Appealed claim 7 defines subject matter for determining the second alignment approximation that includes an approximation of components of a 3x3 homographic matrix. The examiner's position is that implementing a 3x 3 homographic matrix to determine the second alignment approximation would have been obvious to a person or ordinary skill within the art in view *Frazier et al.* and *Gupta et al.*. The appellant, respectfully, points out that the Final Office Action does not provide any disclosure or suggestion within the cited references for use of a 3 x 3 homographic matrix. Moreover, the Final Office Action has not indicated how a 3x3 homographic matrix would be used within either of the cited references to determine the alignment approximation. Note that there is no 3x 3 homographic matrix discussed within either of the cited references. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution that is suggested in the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Appealed claim 8

Appealed claim 8 defines subject matter wherein the determining of at least one of the first and second alignment approximations includes identifying corners in the first and second images based on a determination of Minimum Intensity Changes at the corners. The Final Office Action cites column 3, lines 44-51 of *Gupta et al.* in support of the assertion that *Gupta et al.*

teach the subject matter defined by appealed claim 8. The appellant respectfully points out that the subject matter defined by appealed claim 8 is not found in the cited section of *Gupta et al.* There is no any disclosure or suggestion within *Gupta et al.* of corners in the first and second images being based upon a determination of Minimum Intensity Changes in the corners. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution made in the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Appealed claim 9

Appealed claim 9 defines subject matter to detect motion of an object by comparing multiple images. The Final Office Action cites references, *Gupta et al.* and *Frazier et al.* that do no teach or suggest detecting motion by comparing a set of images, either alone or in combination. The examiner's position is that cited reference, *Gupta et al.* at column 4, lines 41-46 teach detecting motion and the alignment of images, wherein the aligning the first and second images includes a determination of first alignment approximation based on distances. The appellant, respectfully, points out that there is no discussion of detecting motion within *Gupta et al.*

As previously discussed, *Gupta et al.* employ match point generation between corresponding sets of point within the mask image and the opacified image. The mask image is then subtracted from the opacified image (see col. 2, lines 31-46). *Gupta et al.* teach the

matching of corresponding sets of point between a mask image and an opacified image. *Gupta et al.* do not teach or suggest determining a first alignment approximation, based on distances between one or more points in the first image and the second image. Once match points are correlated, *Gupta et al.* teach continually employing the transformation for matching the same match points in different images (see col. 3, lines 53-62). *Gupta et al.* teach repeatedly using the transform taught therein for continually registering the various mask images with the opacified image (see column 4, lines 7-12). It should be noted that *Gupta et al.* do not disclose or suggest determining a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image. Moreover, *Gupta et al.* do not teach or suggest aligning images based by combining of a first alignment approximation with a second alignment approximation.

As previously discussed, *Frazier et al.*, teach implementation of a Laplacian operation on a single image to enhance edges and perform shadow reduction. The rejection in the Final Office Action asserts that the Laplacian operation taught by *Frazier et al.* is equivalent to the first and second alignments as defined by appealed claim 9. The appellant respectfully points out that there is no disclosure, or suggestion, within *Frazier et al.* of first, second or any alignments whatsoever. The appellant additionally points out that *Frazier et al.* do not perform any processing on two different images. *Frazier et al.* teach (as previously discussed under appealed claim 1) processing that is performed to enhance a single image, place the signal image inside a template and again enhance the signal image.

Appealed claim 9 to present invention defines subject matter for "aligning the second image to the first image, based on the first alignment approximation, to form and initially align second image" and "aligning the second image to the first image, based on the combination of the first and second alignment approximations." These elements of appealed claim 9 are not found alone or in the combination within *Gupta et al.* and *Frazier et al.* as contended by the rejection contained within the Final Office Action. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The appellant respectfully points out that during examination the claims must be interpreted as broadly as their terms reasonably allow that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir.1989). The appellant respectfully points out that appealed claim 9 recites aligning and that aligning is not equivalent to edge enhancement, or shadow reduction, or any combination thereof. The specification to the present invention clearly describes the alignment of two images, particularly page 7, beginning at line 5, wherein the process of the recited inventive alignment is described by the specification to present invention in detail. The appellant has the right to be his own lexicographer. The courts have held that where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim, and that the meaning of words used in a claim is not construed in a lexicographic vacuum, but in the context of the specification and drawings. *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999). Thus, while the words within a claim must be given their broadest **reasonable** interpretation the appellant, respectfully, submits that the examiner's interpretation and treatment of the term aligning as being equivalent to edge enhancement or shadow reduction is **not a reasonable** interpretation. The terms "alignment", "aligned", and "aligning" are clearly given definitions by the specification to present invention. These terms are used extensively throughout the entire specification to the present invention in a manner that is wholly inconsistent with the interpretation of edge enhancement or shadow reduction that has been applied to them by the rejection contained in the Final Office Action.

Appealed claim 10

Appealed claim 10 defines the subject matter of appealed claim 9 further comprising determining the first alignment approximation based on the first resolution being a low-resolution representation of the first and second images, and determining the second alignment approximation is based on the second resolution being a higher-resolution representation of the first and second images. The examiner's position is that *Gupta et al.* teach the subject matter of appealed claim 10. As previously discussed *Gupta et al.* do not teach or suggest determining a first alignment approximation, based on distances between one or more points in the first image

and the second image. Additionally, *Gupta et al.* teach repeatedly using the transform taught therein for continually registering the various mask images with the opacified image (see column 4, lines 7-12). Furthermore *Gupta et al.* do not teach or otherwise suggest determining a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image. Moreover, *Gupta et al.* do not teach or suggest aligning the images based on the combination of a first alignment approximation with a second alignment approximation.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution made in the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Appealed claim 11

Appealed claim 11 defines subject matter for identifying the motion of objects in multiple images based on color matching. The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination. The examiner's position as stated in the Final Office Action is that *Gupta et al.* teach that x-ray images can be seen in gray, black or white. The Examiner has taken the position of that gray, black or white as discussed in *Gupta et al.* can be read as colors. The appellants respectfully, assert that: (1) black and white are not colors and gray is simply a combination of

black and white; and (2) that *Gupta et al.* do not teach or suggest identifying the motion of objects in multiple images, either in black and white or color. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). There is no disclosure or suggestion *Gupta et al.* for "identifying the objects in the set of aligned images based on color matching" as defined by appealed claim 11. The appellant, respectfully asserts that all the elements within appealed claim 11 are not addressed by the rejection contained in the Final Office Action, therefore a *prima facie* case of obviousness is not made. Furthermore, the rejection to appealed claims 11 does not provide any reasonable expectation of success within the cited references for the combination made therein.

Appealed claim 12

Appealed claim 12 defines subject matter for determining a location of the object in each image of the set of aligned images, and determining a movement of the object by comparing the location of the object in each image. The examiner's admits that *Gupta et al.* do not teach determining movement of object. The examiner's position is that *Frazier et al.* teach applying a Laplacian operator and that alignment by applying the Laplacian operator for determining a location of the object in each image of the set of aligned images would have been obvious to a person of ordinary skill within the art. As previously discussed, *Frazier et al.* do not teach alignment by application of a Laplacian operator but instead teach is enhancement by application of a Laplacian operator.

Appealed claim 12 recites determining a location of the object in each of the set of aligned images and determining a movement of the objects by comparing a location of the object in each image. As previously discussed, *Frazier et al.* do not disclose or suggest operations on a set of images but teach operations on a single image that is enhanced and not aligned. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior

art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The appellant respectfully asserts that all the elements within appealed claim 12 are not addressed by the rejection contained in the Final Office Action and that a *prima facie* case of obviousness is not made. The rejection to appealed claim 12 does not present any evidence from the cited references that would disclose or suggest to a person skilled in the art that determining the location of an object in each image of the set of aligned images, and determining a movement of the object by comparing the location of the object in each image could be ascertained by applying a Laplacian operator to the teaching of *Gupta et al.*

Appealed claim 13

Appealed claim 13 defines subject matter for a motion detection system. The examiner's position is that *Gupta et al.* teach at column 1, lines 31-37 the step of a motion detecting system. The appellant respectfully points out that column 1, lines 31-37 of *Gupta et al.* simply states that while certain types of patient motion can be controlled other types are much harder to control and that in such instances only the opacified image is used. The appellant further points out that column 1, lines 31-37 of *Gupta et al.* is part of the discussion to the prior art to the invention taught by *Gupta et al.* The only logical interpretation of this passage cited by the examiner is that only a single image is used in these instances where there is motion, which shows that *Gupta et al.* does not envision alignment of multiple images in cases where motion is involved. The appellant, respectfully, points out that the rejection in the Final Office Action attempts to integrate this single mentioning of the word "motion" with the procedures later discussed by *Gupta et al.* that are only intended still images. This application of the term "motion" is clearly contrary to the manner in which it is used within *Gupta et al.* The rejection to appealed claim 13 renews the assertion that *Frazier et al.* teach alignment. As previously discussed, *Frazier et al.* teach edge enhancement and shadow reduction. *Frazier et al.* do not teach the alignment of different images as asserted by the Final Office Action. Moreover, neither *Frazier et al.* nor *Gupta et al.* disclose, or suggest, motion detection or comparing aligned images to detect the motion of objects within the images that are aligned. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Appealed claim 13 defines subject matter for detecting motion within multiple images by "aligning the second image to the first image, based on the first alignment approximation, to form and initially aligned second image" and "aligning the second image to the first image, based on the combination of the first and second alignment approximations." These elements of appealed claim 13 are not found alone or in the combination made by the rejection contained within the Final Office Action. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The appellant respectfully points out that during examination the claims must be interpreted as broadly as their terms reasonably allow that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir.1989). The appellant respectfully points out that appealed claim 13 recites aligning and that aligning is not equivalent to edge enhancement, or shadow reduction, or any combination thereof. The specification to the present invention, particularly beginning at page 7, line 5, clearly describes the alignment of two images in detail. The appellant has the right to be his own lexicographer. The courts have held that where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim, and that the meaning of words used in a claim is not construed in a lexicographic vacuum, but in the context of the specification and drawings. *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999). Thus, while the words within a claim must be given their broadest **reasonable** interpretation the Appellant, respectfully, submits that the Examiner's interpretation and treatment of the term aligning as being equivalent to edge enhancement or shadow reduction is **not a reasonable** interpretation of the term alignment. The terms "alignment", "aligned", and "aligning" are clearly given definitions by the specification to present invention. These terms are used extensively throughout the entire specification to the present invention in a manner, which is wholly inconsistent with the interpretation of edge enhancement or shadow reduction that has been applied to them within the rejection contained in the Final Office Action.

Appealed claim 14

Appealed claim 14 defines subject matter of appealed claim 13 further comprising for determining the first alignment approximation is based on the first resolution being a low-resolution representation of the first and second images, and determining the second alignment approximation is based on the second resolution being a higher-resolution representation of the first and second images. The examiner's position is that *Gupta et al.* teach the subject matter of appealed claim 14. As previously discussed *Gupta et al.* do not teach or suggest determining a first alignment approximation, based on distances between one or more points in the first image and the second image. Additionally, *Gupta et al.* teach continually matching the same match points. Furthermore *Gupta et al.* and do not teach or otherwise suggest determining a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image. Moreover, *Gupta et al.* do not teach or suggest aligning the images based on the combination of a first alignment approximation with a second alignment approximation.

Appealed claim 16

Appealed claim 16 defines subject matter of appealed claim 13 further comprising a memory for storing a representation of a target image, and wherein the processor is further configured to identify a target within the satellite images, based on the representation of the target image. The appellant, respectfully, points out that appealed claim 16 recites a memory for storing the representation of a target image and a processor being configured to identify a target within the set of aligned images based on the representation of the target image. A memory for storing a representation of a target image and the processor being configured to identify a target in the satellite images are elements that relate to the motion detection system recited by claim 13. As previously discussed, neither of the cited references addresses motion between multiple images. There is a specific relationship between claim 16 and claim 13 from which claim 16 depends and also between the processor, memory and a target image. This relationship is not mentioned by the rejection contained in the Final Office Action. The appellant, respectfully, submits that there are features defined by appealed claim 16 are not addressed by the rejection

contained in the Final Office Action. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The rejection does not address the subject matter for storing the representation of a target image and a processor being configured to identify a target within the set of aligned images based on the representation of the target image. Accordingly, these limitations are not considered by the rejection to appealed claim 16.

Appealed claim 17

Appealed claim 17 defines subject matter of appealed claim 16 wherein the representation of the target image is a characterization based on color content that the target image. Appealed claim 17 defines subject matter that includes the representation of the target image as based on color content of the target image. The rejection to appealed claim 17 contained within the Final Office Action states that *Gupta et al.* teach gray black and white. The Examiner's position is that gray, black and white are colors. The appellant respectfully disagrees; black and white are not colors, and gray is simply a combination of black and white. The rejection of appealed claim 17 makes no mention and does not address the subject matter for identifying a target within aligned images. Moreover the rejection of appealed claim 17 makes no mention and does not address the subject matter for identifying a target based on color content within aligned images. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Therefore, a *prima facie* case of obviousness is not made by the Final Office Action.

Appealed claim 18

Appealed claim 18 defines subject matter for determining a location of the object in each image of the set of aligned images, and determining a movement of the object by comparing the location of the object in each image. The examiner's position is that *Gupta et al.* do not teach determining movement of object however, *Frazier et al.* teach applying a Laplacian operator and that alignment by applying a Laplacian operator would be obvious to a person of ordinary skill within the art. As previously discussed, *Frazier et al.* do not teach alignment by application of a Laplacian operator but instead teach enhancement by application of a Laplacian operator. Appealed Claim 18 defines determining a location of the object in each of the set of aligned images and determining a movement of the objects by comparing a location of the object in each image. As previously discussed, *Frazier et al.* do not disclose or suggest operations on a set of images but teach operations on a single image that is enhanced and not aligned. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The appellant respectfully asserts that all the elements within appealed claim 18 are not addressed by the rejection contained in the Final Office Action, therefore a *prima facie* case of obviousness is not made.

Appealed claim 19

Appealed claimed 19 defines subject matter for determining the first alignment approximation including an approximation of at least one of a rotation component and a translation component in an image space of the first and second images. The examiner's position is that *Gupta et al.* at column 3, lines 63-67 teach "determining the first alignment approximation includes an approximation of the least one of a rotation component and a translation component in image space of the first and second images." The appellant, respectfully, points out *Gupta et al.*, at column 3, lines 63-67 teach that image tiles within two images can be rotated with respect to each other and that the mismatch arising because of such rotation can be corrected by the two-

dimensional perspective transformation on user provided points. There is no disclosure, or suggestion, within *Gupta 'et al.* for determining the first alignment approximation using an approximation of at least one of a rotation component and a translation component in image space of the first and second images as recited by appealed claim 19. Moreover, as previously discussed, *Frazier et al.* do not teach or suggest aligning different images as asserted by the examiner in the Final Office Action.

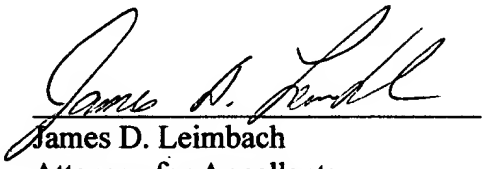
Appealed claim 20

Appealed claim 20 defines subject matter for determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix. The examiner's position is that implementing a 3x 3 homographic matrix to determine the second alignment approximation would the obvious to a person or ordinary skill within the art in view of the combined teachings of *Gupta et al.* and *Frazier et al.* The appellant, respectfully, points out that the Final Office Action does not provide any disclosure or suggestion within the cited references for use of a 3 x 3 homographic matrix. Moreover, the Final Office Action has not indicated how a 3x3 homographic matrix would be used within either of the cited references to determine the alignment approximation. Note that there is no 3x 3 homographic matrix discussed within the cited references. In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has not provided any expectation of success for the substitution made in the Final Office Action. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The appellant, respectfully, asserts that neither the suggestion to make the combination made in the Final Office Action nor the reasonable expectation of success is found in the either of the cited references *Frazier et al.* or *Gupta et al.*, either alone or in combination.

Conclusion

In summary, the examiner's rejections of the claims are believed to be in error for the reasons explained above. The rejections of each of claims 1-20 should be reversed.

Respectfully submitted,



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APPENDIX 1. Claims on Appeal

1. A method of aligning a first image to a second image, comprising:

determining a first alignment approximation, based on distances between one or more points in the first image and the second image, with the first and second images at a first resolution,

aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image,

determining a second alignment approximation, based on the distances between one or more points in the first image and the initially aligned second image, with the first and second images at a second resolution different from the first resolution, and

aligning the second image to the first image, based on the combination of the first and second alignment approximations.

2. The method of the Claim 1, wherein

aligning the second image to the first image based on the combination of the first and second alignment approximations is effected by:

aligning the initially aligned second image, which is based on the first alignment approximation, to the first image, based on the second alignment approximation.

3. The method of claim 1, wherein

determining the first alignment approximation is based on the first resolution being a low-resolution representation of the first and second images, and

determining the second alignment approximation is based on the second resolution being a higher-resolution representation of the first and second images.

4. The method of claim 1, wherein

determining at least one of the first alignment and second alignment approximations includes applying the RANSAC algorithm.

5. The method of claim 1, wherein

determining the first alignment approximation includes an approximation of at least one of a rotation component and a translation component in an image space of the first and second images.

6. The method of claim 5, wherein.

determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix.

7. The method of claim 1, wherein

determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix.

8. The method of claim 1, wherein

determining at least one of the first and second alignment approximations includes

identifying corners in the first and second images based on a determination of Minimum Intensity Changes at the corners.

9. A method of tracking an object based on a first image and a second image, comprising:

aligning the first and second images to form a set of aligned images, and

detecting motion by comparing the set of aligned images,

wherein

aligning the first and second images includes:

determining a first alignment approximation, based on distances between one or more points in the first image and the second image, with the first and second images at a first resolution,

aligning the second image to the first image, based on the first alignment approximation, to form and initially aligned second image,

determining a second alignment approximation, based on the distances between one of or more points in the first image and the initially aligned second image, with the first and second images at a second resolution different from the first resolution, and

aligning the second image to the first image, based on a combination of the first and second alignment approximations.

10. The method of claim 9, wherein

determining the first alignment approximation is based on a low resolution representation of the first and second images, and

determining the second alignment approximation is based on a higher resolution representation of the first and second images.

11. The method of claim 9, further including

identifying the objects in the set of aligned images based on color matching.

12. The method of claim 9, further including

determining a location of the object in each image of the set of aligned images, and

determining a movement of the object by comparing the location of the object in each image.

13. A motion detecting system comprising:

a processor that is configured to:

align a first image and a second image, to form a set of aligned images, by:

determining a first alignment approximation, based on distances between one or more points in the first image and the second image,

aligning the second image to the first image, based on the first alignment approximation, to form an initially aligned second image,

determining the second alignment approximation, based on distances between one or more points in the first image and the initially aligned its second image, and

aligning the second image to the first image, based on a combination of the first and second alignment approximations; and

compare the set of aligned in the images to identify motion of objects within the first and second images.

14. The motion detecting system of claim 13, wherein

The processors configured to:

determine the first alignment approximation by processing and low-resolution representation of at least one of the first and second images, and

determine the second alignment approximation by processing the higher-resolution representation of the first second images.

15. The motion detecting system of claim 13, further including at least one camera for producing the first and second images.

16. The motion detecting system of claim 13, further including

a memory for storing a representation of a target image, and

wherein

the processor is further configured to identify a target within the set of aligned images, based on the representation of the target image.

17. The motion detecting of claim 16, wherein

the representation of the target image is a characterization based on color content that the target image.

18. The motion detecting system of claim 13, further including

determining a location of an object in each image of the set of aligned images, and

determining a movement of the object by comparing the location of the object in each image.

19. The motion detecting system of claim 13, wherein

determining the first alignment approximation includes an approximation of at least one of rotation component and a translation component.

20. The motion is detecting system of claim 19, wherein

determining the second alignment approximation includes an approximation of components of a 3x3 homographic matrix.